8.9.a 3

~~444 C~~
3

A Diſcovery of Subterraneall Treaſure, viz.

Plattes

Of all manner of *Mines* and *Mineralls*,
from the *Gold* to the *Coale*; with plaine
Directions and Rules for the finding of
them in all Kingdomes and Countries.

And alſo the *Art* of Melting, Refining, and Aſſaying of
them is plainly declared, ſo that every ordinary man,
that is indifferently capacious, may with ſmall
charge preſently try the value of ſuch
Oares as ſhall be found either by
rule or by accident.

*Whereunto is added a reall Experiment whereby every ignorant
man may preſently try whether any peece of Gold that
ſhall come to his hands be true or counterfeit, without
defacing or altering the forme thereof,
and more certainly than any Gold-
ſmith or Refiner could for-
merly diſcerne.*

Alſo a perfect way to try what colour any Berry, Leafe, Flower,
Stalke, Root, Fruit, Seed, Barke, or Wood will give:
with a perfect way to make Colours that they
ſhall not ſtayne nor fade like ordinary
Colours.

*Very neceſſary for every one to know, whether he be Travailer
by Land or Sea, or in what Country, Dominion,
or plantation ſoever hee ſhall
Inhabite.*

Imprinted at *London* by *I. Okes*, for *Iaſper Emery*, and
are to be ſold at his ſhop at the ſigne of the Eagle and
Child in Pauls Church-yard next Watlin-ſtreet.
M DC XXXIX.

* * *

Imprimatur:
Tho. VVykes. February
19. 1638.

* * *

MVSEVM
BRITANNICVM

V Wf 13

TO HIS VVORTHY FRIEND MASTER William Englebert *Eſquire.*

Health, and Happineſſe Temporall and Eternall, is heartily wiſhed.

SIR,

THe goodneſſe of your diſpoſition hath brought you to this trouble and paines at this time, to peruſe theſe Lines; by giving me ſo freely your Iudicious approbation of my former labours: now you have gotten a Cuſtomer of mee, for the like courteſie to bee renewed; for which I ſhall bee bound in a double Bond.

When I reade the words of our SAVIOUR CHRIST, after hee had fed ſuch a number of people with a few Loaves and Fiſhes, *viz.* How hee Commanded the broken Meate to bee gathered up carefully that nothing be loſt; when as hee could (no doubt) have made an hundred times as much with a word ſpeaking: I conceived that it was done for a patterne of frugality, to ſhew us how carefull wee ought to bee in the preſervation of ſuch things from loſſe, which are ordained to releeve and ſuſtaine the lives of Men: therefore I being from my Child-hood a ſtrict obſerver of the great loſſe that came to this Country, partly through ignorance, and partly through negligence, in rayſing that benefit out of the ſuperficiall, and ſubterraneall Treaſures of the Earth, ordained of GOD (no doubt) for the releefe and ſuſtenance of mens livings; thought that I could not bee better employed, then to advertiſe the World thereof, and to Divulge my knowledge, and experience in theſe affaires for the common profit; deeming my ſelfe obliged thereunto; for that it hath pleaſed GOD to give a large bleſſing to my long labours, and Charges ſpent in theſe and ſuch like affaires.

Alſo when I heard the manifold complainings of indigent people, of the hardneſſe of the World, and of the difficultie of obtaining their livings: I have knowne many people of indifferent vertuous diſpoſitions, for very want of meanes, to take in hand ſome actions which were not laudable.

Theſe with divers other Motives have beene ſpurres to mee, to Publiſh not onely this Booke of the diſcovery of Subterraneall Treaſures; but alſo my other Booke, mentioned in the Preface enſuing, of the Diſcovery of hidden Treaſures in the ſuperficies of the Earth: Both which Bookes, if they ſhall bee diligently peruſed, and induſtriouſly practiſed; will adminiſter ſufficient cure for all the Maladies before mentioned.

Now whereas the Cuſtome is to make choice of a Patron to protect the Author from the Calumniations of malevolent ſpirits; yea, though experience her ſelfe (the Miſtreſſe of Art) ſhall be ready as an Handmaid, to manifeſt the truth of his aſſertions; for that opinion is generally Deified, and almoſt every where ſwayeth all; and this worthy Miſtris Experience (which ſuffereth no impoſture to raigne) is many times lightly eſteemed and thruſt out of the doores.

I therefore beſeech you once againe to lend mee your grave Judgement, and approbation, ripened by threeſcore yeares practice, and experience, in things partly of this nature, which I will make bold to put into the Ballance, to over-weigh the ignorance, and unskilfulneſſe of all detractors whatſoever; making no queſtion, but that as Thunder and Lightning cauſed *Heliogabalus* to creepe into an hole: notwithſtanding his boldneſſe, and hardneſſe in calme weather; In like manner ſo manifeſt experience will drive away all Sophiſticall oppoſition. So I humbly take my leave

Your bounden Servant,
Gabriel Platter.

To the Reader.

WHereas divers reaſons have joyned together to move mee to take in hand this Taske: I will declare ſome few of thoſe that may give the beſt ſatiſfaction to the Reader, in this manner following. Firſt, when I conſidered the great number of Treaſure and riches which lyeth hidden in the belly of the Earth, and doth no good at all: and alſo the great benefit which might accrew to divers Kingdomes and Countries, by ſetting people on worke; not onely in the diſcovering of them, but alſo in the ſeverall opperations about the digging, melting, and refining of them: alſo when J conſidered that the moſt part of the Mines hitherto diſcovered have come by meere accident: I thought that J could not be better employed, than to give Rules and Directions for the ſame: for though it is not unpoſſible, that if two men be ſent to ſeeke a thing that is loſt, and one of them bee hudwinked, and the other have the uſe and benefit of his eyes, yet the perſon hudwinked may caſually ſtumble upon it; nevertheleſſe it is twenty to one that

that the other ſhould have found it before him : ſo in this caſe, I dare hazard a Wager of twenty to one, that there will bee more good Mines diſcovered within ſeven yeares after the divulging of theſe Rules and directions, than hath beene in twenty-ſeven yeares before: Alſo when I conſidered that many Mineralls found out by accident, have come to no good by reaſon of the diſtance of place from Refiners, and men of judgement and experience: for that the finders thereof were loath to come ſo farre, and ſpend ſo much money upon an uncertainty as the triall thereof would require : I thought I could not doe a better deede, than to ſhew the manner of ſuch trials in ſuch plaine manner that every man may try the ſame in his Ship, or Chimney Corner with little coſt and labour.

And the truth of this I can witneſſe by experience; for when I was a youth, and had no skill in theſe affaires; I happened upon a Minerall faire to ſee to, and could find no man neerer than an hundred miles which could enforme me of the true value thereof: whereupon, rather then to be at ſuch charges as the triall required, I ſuffered the ſame to bee neglected.

And though that the rules and directions given in this Booke bee exquiſite, and give ſtrong ſignes of Mettalls and Mineralls; yet I would bee loath that any man ſhould be thereby animated no take in hand great Voyages, and conſume his Eſtate in the purſuite of this deſigne; deeming them to bee unpoſſible ever to faile: but rather to make this a *part of his buſineſſe, when hee ſhall come to ſuch places as yeeld ſtrong probabilities.*

And ſo farre I am from envying the former wayes in finding them by accident, that I have partly taken this paines; that thoſe which ſhall hereafter bee found by accident may not bee neglected as I conjecture, that many have beene by my owne formerly mentioned.

For I could wiſh that many men had the like fortune that one had, who in the climbing up of the great Mountaine called Poterſee, *in the Kingdome of* Perue *in the* Weſt Indies, *tooke hold of a young Tree to ſtay himſelfe withall; and thereby plucked it up by the rootes, whereunto there did adheare good Silver Oare; which being tried and found rich, hath ever ſince beene wrought upon: and innumerable treaſure and riches have therehence beene digged, to the valew of many hundred Millions of pounds Sterling.*

And to the end I may no longer ſtay the Reader with Preambles, I will divide my booke into 12. *Chapters, like as I did my Booke Printed* Anno. Dom. 1638. *Entituled,* A diſcovery of hidden Treaſure*: wiſhing all thoſe that deſire to be skilfull in theſe affaires; to take a little paines to read that Booke, which differeth from this no otherwayes, but as the Art of Surgery differeth from the Art of Phyſicke: for as Surgeons deale chiefly with the externall parts of mans body, yet ſtand in need of the knowledge of all the parts; and as Phyſitians chiefly deale with the internall parts, yet cannot be without*

out the knowledge of the externall parts: So though that Booke treate wholly upon the diſcovering of the Treaſures hidden in the ſuperficies and exurball parts of the Terreſtriall Globe, yet the knowledge of many things therein contained are very conducible to make a skilfull Mineraliſt, giving you further to underſtand, that if any good will bee done at all, it will bee done with a ſmall Charge: and with ſomewhat leſſe than before this Booke was publiſhed; if you obſerve the Contents thereof adviſedly:
So I take my leave
and reſt,

Your hearty Well-wiſher.
G. P.

THE TABLE.

CHAP. 1. Wherein is ſhewed by a playne Demonſtration the naturall cauſe of the Generation and production of Mountaynes and Mettals: whereby the Seekers may obtayn a good competent meaſure of knowledge to guide them where to ſeek for the other external ſigns.

Chap. 2. Wherein is ſhewed the ſignes of Mines and Minerals, with the manner how to worke to find the ſame. *pag.* 9

Chap. 3. Now that we are come to the melting and refining of *Metals*, I will begin firſt with the *Oare of Lead*, becauſe that is one of the moſt common *Metalls* found in theſe *Northern Countries.* *p.* 14

Chap. 4. Wherein is ſhewed the operations *for Tinns.* *pa.* 20

Chap. 5: Wherin is ſhewed the operations *of Iron.* *pa.* 24

Chap. 6. Wherein is ſhewed the operations *of Copper.* *p.* 26

Chap. 7. Wherein is ſhewed the operations of *Silver.* *pa.* 30

Chap. 8. Wherein is ſhewed the operations of *Gold:* and reall experiments whereby any man may preſently trye whether any peece of Gold be true or counterfeit, without defacing or altering the forme thereof. *pag.* 33

Chap. 9. Wherein is ſhewed how true and perfit Gold may be made by *Art*, with loſſe to the workman. *pag.* 40

Chap. 10. Wherein is ſhewed the operations for ſome of the inferiour *Metals.* *pag.* 44

Chap. 11. Wherein is ſhewed the wayes to finde out pit-coales: Alſo the naturall cauſe of the generation of them, by a plain demonſtration. *p.* 47

Chap. 12. Wherein is ſhewed a perfit way to trye what colour any *Berry*, *Leaſe*, *Flower*, *Stalke*, *Root*, *Fruit*, *Seed*, *Barke*, or *Wood* will give: Alſo a perfit way to make colours fixed, which will not abide the ordinary way. *pag.* 52.

A DIS-

A Diſcovery of all ſorts of Mines and Minerals.

Chapter I.

Wherein is ſhewed by a plaine Demonſtration the naturall cauſe of the generation and production of Mountaines and Mettals: whereby the Seekers may obtaine a good competent meaſure of knowledge to guide them where to ſeeke for the other Externall ſignes.

SALOMON ſayth, that Hope deferred breaks the heart; but the deſire obtayned, is a Tree of Life: If Hope onely deferred breake the Heart; then Hope fruſtrated muſt needs breake it a great deale more.

To the end therefore that our Hope

may not bee too frequently fruſtrated, I will firſt declare the places where there is no probability to finde out Mettalls, and afterwards I will ſhew where there is ſtrong probability: and then in the next Chapter I will ſhew how to goe about the worke, to find out the ſtrong ſignes which may rightly guide the ſeekers to obtaine their deſire.

And firſt, there is no probability that any Mettalls can bee generated neare unto the North and South poles of the Globe, for thoſe can by no meanes have any convenient Matrix for ſuch a generation, being by all probabilities nothing but two Iſlands of Ice, for if they were any thing elſe, the courſe of Nature muſt needs alter, and change, and runne preſently out of order.

For as there is in the burning Zones a continuall exhalation of Water, and rarifying of the ſame into Ayre: ſo there muſt needes bee in the North and South a continuall condenſation of Aire into Water to ſupply the ſame againe, elſe the motion cannot bee perpetually circular.

Now whereas the North and South parts, by reaſon of their coldneſſe, cannot ſuffer the ſaid condenſed Meteors to deſcend in forme of Water, but in the forme of Snow, Haile, or ſome ſubſtance of like nature, which there cannot melt in the ſuperficies for want of heate, it is very probable that the new Accretion this way produced, doth preſſe downe ſtill with its weight the ſaid Ilands of Ice towards the Center, where the centrall heate melteth it off continually, by which meanes the ſphericall forme of both Earth and Water are perpetually preſerved.

And if any man bee of a contrary opinion, I will not envie him; but as for my owne part, I will ſell my Intereſt and hope of Mettalls in thoſe places for a Farthing, although I had a device that the cold there could not prevent my ſeeking for them.

Alſo in Vallies and plaine Champion Countries, there is no hope to proſper in this deſigne, for the wombe of ſuch earth is not apt for ſuch a generation, the Reaſons whereof will preſently follow.

Now that wee have left us no other places to ſeeke in but the rocky Mountaines, I will ſpend the reſt of this Chapter in demonſtrating the naturall cauſe of the generation of Rocks, Mountaines, and Metalls, and ſo proceed forward.

And firſt I will ſet downe the Opinions of others with their Confutation, and laſtly the confirmation of mine owne Opinion by irrefragable Demonſtration.

Some have thought that the mighty Creator made the vaſt, deformed, and craggy Rocks and Mountaines in the beginning, but this appeareth to bee an Opinion, whereby great diſhonour may reflect upon the Creator, who beſides his Omnipotent power, doth continually make uſe of his admirable Wiſdome, and exquiſite Artifice in all his Workes, and made nothing deformed or unfit for the uſe for which it was created: Now the Earth being ordained to beare Fruits for the uſe of Men, and Rocks are not fit for that purpoſe, it plainely appeareth that they came by accident.

Some others have thought that they came by accident, but yet that they were produced by accretion in length of time, even as Warts, Tumours, Wenns, and Excreſcences are engendred in the ſuperficies of mens bodies: and of this Opinion I my ſelfe was in my minority, till ſuch time as by practicall experience I found out a more probable opinion.

Now for a plaine demonſtration, let this Experiment following bee tryed, and I make no queſtion, but that it will ſatisfie every one that hath an inquiſitive diſpoſition.

Let there bee had a great retort of Glaſſe, and let the ſame be halfe filled with Brimſtone, Sea-coale, and as many bituminous and Sulphurious ſubterraneall ſubſtances as can bee gotten: then fill the necke thereof halfe full with the moſt free earth from ſtones that can be found, but thruſt it not in too hard, then let it bee luted, and ſet in an open Furnace to diſtill with a temperate Fire, which may onely kindle the ſaid ſubſtances, and if you worke exquiſitely, you ſhall finde the ſaid Earth petrified, and turned into a Stone: you ſhall alſo finde cracks and chinkes in it, filled with the moſt tenacious, clammy, and viſcous parts of the ſaid vapours, which aſcended from the ſubterraneall combuſtible ſubſtances.

Whereby it appeareth that the ſame thing is done by Nature, and that the Rocks and craggy Mountaines are cauſed by the vapours of Bituminous and Sulphurious ſubſtances kindled in the bowells of the Earth , of which there bee divers ſo well knowne, that they neede not bee heere mentioned : Alſo it appeareth that the veines of Mettalls are engendred in the crackes and crannies of the ſaid Mountaines, out of the moſt clammy and glutenous part of the ſaid vapours there adhering , where the cold gave them leave to bee congealed and condenſed.

Now concerning the exaltation of the Mountaines above the Vallies , it appeareth to come to paſſe by the water in former times, whoſe property is to weare away by its motion the moſt looſe earth , and to leave the more firme ground, and rockie places higheſt : but whether this was done by *Noahs* Flood , or by the Sea in former Ages, is doubted. As for my opinion, I referre the Reader to my Booke formerly mentioned , and if any man be in doubt of this, let him take the Stone formerly made by Art, and place it ſo, that the motion of the water may worke upon it, and you ſhall finde it worne moſt in the looſeſt places, and leaſt in the more firme compacted places; thereby ſhewing the naturall cauſe of Mountaines and Valleyes. Alſo if a River ſhould bee turned out of its courſe, and the bottome thereof accurately conſidered upon, how the water by his motion hath worne away the Earth moſt in the looſeſt Earth, and leaſt in that which is more firme, it doth evidently demonſtrate the naturall cauſe of Hills and Vallies, and the unevenneſſe of the Earth cauſed by the motion of the Sea in former Ages.

Chap. 2.

Wherein is ſhewed the ſignes of Mines and Minerals, with the manner how to worke to find the ſtone.

WHen we come to the Rocky and Craggy Mountaynes, the firſt thing we are to obſerve, is the barrenneſſe of them; For the more barren they are; the greater probability there is that they containe rich Mines and Minerals.

The next worke is to finde out the Springs of Water iſſuing out of the ſaid Mountaynes; and thoſe being found, a quantity of the ſayd water is to be boiled in a new cleane pipkin, to the conſiſtency of thinne Oyle, but not ſo thicke as a Syrrup, and when it is almoſt cold, then to put it into an Vrinall, and to ſet it in the coldeſt place that can be found for 3 daies, then to play the Phyſitian, and to obſerve it exquiſitly what reſiany man be in doubt of this, let him take the Stone formerly made by Art, and place it ſo, that the motion of the water may worke upon it, and you ſhall finde it worne moſt in the looſeſt places, and leaſt in the more firme compacted places; thereby ſhewing the naturall cauſe of Mountaines and Valleyes. Alſo if a River ſhould bee turned out of its courſe, and the bottome thereof accurately conſidered upon, how the water by his motion hath worne away the Earth moſt in the looſeſt Earth, and leaſt in that which is more firme, it doth evidently demonſtrate the naturall cauſe of Hills and Vallies, and the unevenneſſe of the Earth cauſed by the motion of the Sea in former Ages.

Chap. 2.

Wherein is ſhewed the ſignes of Mines and Minerals, with the manner how to worke to find the ſame.

WHen we come to the Rocky and Craggy Mountaynes, the firſt thing we are to obſerve, is the barrenneſſe of them; For the more barren they are, the greater probability there is that they containe rich Mines and Minerals.

The next worke is to finde out the Springs of Water iſſuing out of the ſaid Mountaynes; and thoſe being found, a quantity of the ſayd water is to be boiled in a new cleane pipkin, to the conſiſtency of thinne Oyle, but not ſo thicke as a Syrrup, and when it is almoſt cold, then to put it into an Vrinall, and to ſet it in the coldeſt place that can be found for 3 daies, then to play the Phyſitian, and to obſerve it exquiſitly what reſidence it yeeldeth: if nothing ſettle but a black earth or mudde, it is a ſigne of *Coales*: if ſome part thereof ſhoot into Ice, or a ſubſtance like Ice or Vitrioll, then to obſerve the colour thereof, if it be greene or blewiſh, it is an evident ſigne of Copper; if whitiſh, then it may ſignifie any other Mettall without exception.

The next worke is to goe to the bare Rocks, and there to finde out the clifts, cracks, and cranies: this done, to goe to the toppe: or till you finde ſome Graſſe growing right upon the top of the ſaid Cranies, and then to obſerve diligently the kinde of that Graſſe, and how it differeth from other Graſſe, ordinarily growing in the ſame Mountaine; not onely in forme, but alſo in colour, which colour ſheweth the greateſt difference in the heat of Summer, for the ſubterraneall Vapours iſſuing out of the Orifice of Mines, differ from thoſe which iſſue out of the more ſolide places of the Mountaines,

The next worke is to ſee if there bee

any marcaſites to be found in the ſuperficies of the ſaid Mountaines : which though they are uſually of divers colours, and ſeldome good for any thing, yet they are ſtrong ſignes of Mineralls within, being themſelves the ſpume and froth of the better Mettals, breathed forth, even as Drinke breatheth up his Yeſt or Froth to the Superficies.

And theſe if they be put in an ordinary fire, they will turne blacke, and yeeld a ſmell of *Brimſtone*, *Arſnicke*, *Antimony*, or ſome other thing, commonly called or knowne by the name of a *middle Minerall*.

The next worke is to trie the operation with the *Virgula divina*, as beneath is declared: and where it ſheweth the ſtrongeſt ſignes, as is likewiſe beneath taught: and alſo the place is moſt accompanyed with the other ſignes formerly mentioned: there by digging or boaring to try your fortunes.

The operation with the *Virgula divina* is thus to be performed : ſome obſerve a ſet day and houre with certaine words and Ceremonies at the cutting up of the ſame, which I have found to bee little to the purpoſe: thus I wrought about Midſomer, in a calme morning: I cut up a rod of Haſell, all of the ſame ſprings growth, almoſt a yard long: then I tyed it to my ſtaffe, in the middle, with a ſtrong thred, ſo that it did hang even, like the Beame of a Ballance: thus I carryed it up and downe the Mountaines where Lead growed, and before Noone it guided mee to the Orifice of a Lead mine: which I tryed, having one with me with an hacke of Iron and a Spade; and within two houres we found a veine of Lead Oare, within leſſe than a foot of the graſſe: the ſignes that it ſheweth is to bow down the root end towards the earth as though it would grow there, neare unto the Orifice of a Mine: when you ſee it doe ſo, you muſt carry it round about the place, to ſee that it turneth in the ſtring ſtill to the place, on which ſide ſoever you ſtand.

The reaſon of this attraction I conceived to bee of Kin to the Load-ſtone, drawing Iron to it by a ſecret vertue, inbred by nature, and not by any coniuration, as ſome have fondly imagined.

And the Reaſon of this my opinion was, becauſe that in divers of my practicall Experiments I have obſerved an Attraction betwixt ſeverall things, like that of the Load-ſtone, and Iron; and if it were to good purpoſe, I ſuppoſe that I could ſhew more experience of that kind than any man in *England.*

Now in the new Plantations, as *New-England*, *Virginia*, *Bermudas*, &c. where it is like that few or none have ever tryed, that had any skill in theſe affaires, it is very probable that the Orifice of divers Mynes may be diſcerned with the eye in the clifts of the Rocks in many places, as ſome have beene in *England* at the firſt, before that men grew a little skilfull, and theſe to be loſt and neglected, were a ſhame to the Planters; for theſe Mynes if they prove rich, would yeeld more gaine in one yeare, than their Tobacco and ſuch trifles would yeeld in their whole lives.

CHAP. 3.

Now that wee are come to the melting and refining of Mettalls, I will begin firſt with the Oare of Lead, *becauſe that is one of the moſt common Mettalls found in theſe Northerne Countries.*

THE firſt worke therefore to bee done, is to have a little grate of Iron about a foot broad, like ſuch as are uſed in a Still to make the fire upon: this is to be placed in your Chimney-corner with looſe Bricks, one thickneſſe underneath, and empty in the middle, to give aire to the fire; then lay more Bricks above foure courſe high, round about, and if they be laid without Morter, the fire will burne the better:

then fill it with Char-coales kindled, in the middeſt whereof ſet your melting Pot, with one pound of Lead-oare, and foure ounces of filings of Iron mingled together, and ſo blow to it ſtrongly with a paire of good hand-bellows, till it be well melted downe; then let the Pot be taken out with a paire of Tongs, and ſet to coole: when it is cold, breake it, and knocke off the brittle cinder lying upon the top of the Mettall with an Hammer, till none be left but the malleable mettall, which you may aſſay and refine in this manner following: Take a little Teſt made as beneath, and place it in the middle of your Chimney; lay aſhes about it, about ſixe inches broad, and as high, or rather higher than your Teſt: lay Bricks about the aſhes to hold them up one Brick thickneſſe, and 2. Bricks broad, then lay about halfe a peck of Char-coales upon the Teſt kindled, and when they are almoſt conſumed, and the Teſt red-hot, put them by a little in the middeſt over the Teſt, and lay over a peece of good Oake-wood about five inches ſquare, and eighteene inches long; lay it ſo upon two Tyle-ſheards, that it may lye about an inch and an halfe above the Teſt, then lay on more ordinary Billets and ſome Char-coales amongſt: make the fire about ſo ſtrong as to roaſt a Pigge, then blow to it a little, till the fire burne cleare, then put upon the Teſt two Ounces of your Lead, and blow to it gently, and in three quarters of an houre, all the Lead will bee conſumed, and the Silver will lye in the middle of the Teſt like a little Beade or Pearle, then put aſide the fire, and let all bee cold.

Then you may weigh the Silver in a paire of Gold-ſcales, and ſo caſt it up how much there is in a Tunne of Lead: I have thus tryed many Oares, and have found them to differ in goodneſſe of all ſorts, from Forty ſhillings worth of Silver in a Tunne, to Thirty five pounds worth of Silver in a Tunne, and there is no Lead but it holded ſome Silver, yet it is not worth the refining, unleſſe it yeeld eight or tenne pound upon a Tun at the leaſt.

The Teſt may thus be made: firſt, let a Smith make a Ring of Iron about foure inches wide, and two inches deepe, and a quarter of an inch thick, and as wide above as beneath, and without a bottome.

Then burne Mutton and Beefe-bones in the Fire til they be white, then beate them ſmal in a Morter, and ſearce them fine like meale: then with a little beere or water temper a ſmall part thereof like pappe, then put to ſo much more of the dry powder by little and little, as will make it ſo ſtiffe that it will not be made into a ball, but remaine clammiſh, betwixt powder and paſte: then with a Peſtle ſtampe it gently into your Ring till it be top full, being ſet upon an even board, then ſtampe it a little lower in the middle then at the edges, and ſmooth it with a ſlight ſtone or ſome round glaſſe, ſo ſet it in the Chimney Corner to drye a day or two, and it is ready for your worke.

If you put a quarter of an ounce of Sandivert, and as much Salt Peter mingled together with your Powder of Lead, and filings of Iron at your firſt melting, it will melt ſomewhat ſooner, and with leſſe blowing: beſides that the Sinder will part cleaner from the malleable mettall.

And if you want Char-coales, you may burne Wood in an Oven, and when it is red, and hath done ſmoaking, you may ſet up the Oven ſtone, and dampe it.

Or you may doe the like in an open Chimney, and dampe it in an earthen Pot, or cover it with Aſhes, or dampe it in an hole in the ground, by covering it with a cover, or with Aſhes.

Any of theſe Coales will ſerve to make your aſſayes and tryalls: as for directions for great workes here is no ſuch thing intended in this little Booke: but onely to be ſure whether the worke will quit the coſt: which if it will, then proviſion for great workes will eaſily be brought to paſſe.

And if you want pots, you may bee at choiſe whether you will buy the ſame at the Gold-ſmiths, or Potters in *London*, which ſell *Flanders* melting Pots, or make them your ſelfe by this direction following.

Take right *Flanders* Iugges, ſuch as they uſually put Bottle-Beere in, beate them to fine powder, and ſearce them fine as Meale: Take of this meale foure pound, of the fine powder of *Tobacco* pipe Clay one pound, temper them together with the red fattiſh water that iſſueth out of an Horſe Dung-hill, beate it ſtrongly upon a broad board with a Rowling-pin, till it be ſtiffe Paſte, then faſhion your Pots upon a peece of wood, turned like a Toppe, onely let the ſharpe end of the Toppe be thicker and flatter than an ordinary Toppe; then ſet them to drye in your Chimney Corner a day or two: when you uſe them, ſet them in the fire at the firſt kindling: and ſo let the Fire ſteale upon them till they be red hot: then put in your Mettle and ingredients, and cover it with a Tile-ſheard, or cover of Iron, and ſo melt it downe.

CHAP. 4.

Wherein is ſhewed the Operations for times.

THis Mettall may be melted downe like the Lead, onely omitting the filings of Iron: but when it is melted it is not malleable, till it be compounded with certaine proportions of other Mettalls, which I will not declare, becauſe it is a ſecret of weight belonging to the Pewterers Trade.

And as for refining of it, I am ſure it cannot be done by any artifice; for I ſuppoſe that I have tryed more experiments about it, than any 10. men in

England, becauſe that I ſaw the Refiners could not doe it: therefore I tooke the more paines and induſtry to bring it to paſſe; which if I could have affected, I doe verily beleeve it would have proved a rich Mettall: but the more I tryed the worſe I ſped, for at the laſt of all I melted Gold and Silver equall parts with the Tinne, thinking thereby to bring it downe into the Lead, and to make it to drive faire, and refine kindly, but all was vaine, for the Tinne poiſoned and conſumed ſome of my rich Mettalls.

Now whereas there is no hope of any royall mettall ever to be gotten out of this Minerall: to ſupply the ſhortneſſe of this Chapter, I will ſhew a way how every one that hath a minde to meddle with theſe affaires, may have good poſsibility to enrich themſelves and their poſterity; and be out of danger to undoe themſelves, or to damnifie themſelves in any manner of value that is conſiderable.

For my meaning is, in the taking in hand of this taske, to doe good to all, and hurt to none: and that no man from henceforth ſhall need to bee at a quarter of the charge, ſtudy, or labour, which I my ſelfe have undergone.

Therefore ſeeing that if the moſt ingenious and exquiſite wayes be taken in the deſigne that wit can attaine unto: yet it is but an adventure; for ſometimes all the labour may be loſt, though not often, if good heede be taken; and ſometimes Mines may be found, which will not quit the charges to be wrought upon.

Therefore as wiſe Merchants will not hazzard all in one Bottome, ſo let this never be any mans deſigne totally: for now there is no ſuch need but they may doe all that can bee done at ſuch ſpare times, as any Gentleman, or man of quality, uſually ſpendeth in Hawking, Hunting, Gaming, or other pleaſures; whereof he neede but ſet a part of that time for theſe purpoſes; having the moſt part of his worke done to his hands in this little Booke.

If the Refiners ſhall grudge at me, for diſcloſing ſome of their ſecrets of their Trade, I will anſwer them in this manner: Firſt, I my ſelfe have ſpent the time of divers Apprentiſhips in theſe affaires, and therefore claime a priviledge to diſcloſe my experience for the publicke benefits at my pleaſure.

Secondly, I affirme, that there can be no damage to any refiner, by the divulging of theſe ſecrets: but on the contrary, a great probability of much gaine to that trade: for that, here is nothing, but the skill to make the aſſayes diſcloſed for the Searchers ſatisfaction, before he take in hand great workes; which if he find cauſe ſo to doe, I adviſe him to chuſe the beſt workman that he can get, and one that hath beene long experienced in theſe Workes; and in ſo doing he ſhall proſper the better in his deſigne: And if that every yeare ſome of the increaſe of that Trade ſhal be entertained in theſe affaires, as there is good probability they may; the reſt will have cauſe to give me thanks for my paines, rather than opprobrious ſpeeches.

Chap. 5.

Wherein is ſhewed the Operations of Iron.

As for the melting hereof, ſeeing that it is no worke to be done in the Chimney corner, I will turne over the Reader to learne the practiſe thereof in every Countrey almoſt where he ſhall come.

As for the Refining thereof it may be done in this manner: Take filings of Iron two parts, Antimony one part, it will melt downe like your Lead Oare: take the pure mettall, which will be much more brittle than the Lead was, and melt it with foure times as much Lead as it weigheth, then refine it, as before is taught: if you know the goodneſſe of your Lead before, you may know the augmentation out of the Iron, which will not quit the charges out of any Iron made in theſe Northerne Countries, nor yet out of Spaniſh Iron : but what it may doe out of Iron made in the burning Zone I know not; but I conceive it may doe well, if any ſuch Iron can be found and made in that Climate.

It is true, that good gold may be extracted out of any Iron, but not by any common way, but by a tedious, laborious, and coſtly way: and when all is done, there will be no gaine, unleſſe it be in conceite, which ſatisfieth no man, but thoſe who are of my diſpoſition, which thinketh experience to bee the greateſt gaine that can bee in the world.

CHAP. 6.

Wherein is ſhewed the Operations of Copper.

FIrſt, take your Oare, and breake it into little peeces, about the bigneſſe of Hazell Nuts: then lay a Leere of ſmall Char-coales, an inch thick in your Chimney Corner: then lay on your peeces of Oare, then lay on more Char-coales an inch and an halfe thick upon the Oare, then kindle it, and let the fire burne out of it ſelfe.

Then beate it into ſmall powder, and mingle it with your Sandiver, and Salt-Peter, as you did your Lead, without any filings of Iron, and ſo melt it downe as you did your Lead Oare: onely this difference muſt be uſed, by reaſon that it is harder of fuſion than the Lead Oare: therefore you muſt lay the bricks ſomewhat wider than you did for the Lead, that it may hold more Coales : beſides that, you muſt take the choyſeſt Coales that can be picked out, and no very ſmall ones amongſt them : alſo you muſt have two paire of hand-Bellowes, and two men to blow very ſtrongly, and ſo melt it downe.

As for the refining it is needleſſe to ſhew the manner; for no Copper in theſe Northerne Countries holdeth any royall Mettal, that is conſiderable ; neither Engliſh nor Danske Copper : yet in regard that in ſome Mines in *Hungarie*, there is generated Gold, Silver, and Copper, all in one maſſe of Oare : and alſo in regard that if any Mines of Copper ſhal be diſcovered in *Virginia*, or other ſoutherne Countries, there is ſome good probability that it may containe royall Mettal : therefore I wil ſhew the manner how to refine it, and alſo to part the Gold from the Silver, if it ſhal containe both together.

Firſt, melt one ounce of Copper with

foure ounces of ſuch Lead, as you know the goodneſſe of before: then refine it, and by the augmentation, you ſhall know the worth of the royall mettall contained in the Copper.

If you will trye whether the Copper contained any gold in it, put the aſſay, *viz.* the little Bead or pearle of ſilver into good Aqui-fortis well purified before, and if all diſſolve then the Copper held no gold; but if it leave a black powder undiſſolved, that is gold: for Lead holdeth no Silver that hath any gold in it at all: therefore it is evident that the Gold came out of the Copper.

But if it happen, as often it doth in the refining of baſe Mettals, eſpecially Tinne, Iron, and Copper, that the little Bead, or Pearle remaining in the middle of the Teſt, is not bright and ſhining, like the eye of a Bird, or Fiſh, but rough, blacke, and full of ſcurfe; then if it be but a little in quantity, and that the Teſt be not cracked, nor full of clifts, then put to it ſome more of the ſame Lead, whereof you know the goodneſſe, and drive it off againe as you did at the firſt; and re-iterate this worke till the aſſay be pure and cleane like a little Pearle, or Bead, as it ought to be.

But if it happen that the Teſt is very foule, as often it commeth to paſſe in the Refining of ſtrange Minerals, as *Marcaſites*, and eſpecially thoſe which the Minerallifts call by the name of *Divells Dirt*: Then there is no way but to let all coole, and then to digge it out, and with more Lead to melt it anew in a Pot, and then to let it coole, and then to breake the Pot, and to beate off the Cynder with an hammer, till you come to the malleable Mettall, and you may be aſſured that no royall Mettall will ſtay in the Cinder; but ſinke downe into the Lead, through an attractive vertue betwixt them.

Chap. 7.

Wherein is ſhewed the Operations of Silver.

AS for the melting thereof, when it is found in the Mine of Lead, the Operation is taught in the Chapter of the Lead: but if it be found by it ſelfe, or mixed with Gold without Lead, as many times it commeth to paſſe, then it is to be beaten to powder, and mixed with Sandivere, and Salt-Peter, without any filings of Iron, and ſo melted downe like the Lead Oare; only the fire muſt be ſomewhat ſtronger.

Then it is to be melted with foure times as much Lead, whereof you know the goodneſſe: and ſo to be refined, as before is declared.

But whereas ſometimes this Oare is ſo ſtrongly mixed with Sparre, and ſtony ſubſtances, that it cannot be ſeparated therefrom, by any common manner of worke uſed by the refiners ; then this courſe is to be taken with it: Firſt, beate it into ſmall powder; then waſh away with water the greateſt part of the terreſtreity and filth: then drye the powder, and uſe it in this manner.

Firſt, melt foure ounces of Lead, and when it is melted put to it foure ounces of quick-ſilver, made hot in another melting pot : but let the Lead be almoſt cold before you put to the Quick-ſilver : but yet it muſt be done whilſt that the Lead is liquid.

This done, caſt it into an Iron Morter, ſet warme before upon Embers, and it will be like Pap ; then preſently with a Peſtell, labour in one ounce of your powder, or two at the moſt, till it be incorporated; or ſo much thereof as will incorporate : for the ſtrong and earthy ſubſtance will not incorporate with the Lead and Quicke-ſilver by any Artifice whatſoever: but the ſilver, if any there be, will forſake the Earthy and ſtony ſubſtance, and ioyne it ſelfe with the Lead and Quick-ſilver by an attractive vertue. This done, put it altogether into a melting Pot, with a little Sandivere, and Salt Peter, and melt it downe as you did the Lead Oare: onely this muſt be obſerved, that the fire muſt be more milde at the firſt a great deale, till the Quick-ſilver be evapourated, and more ſtrong at the laſt, that all may flow well together. Then take out the Pot, and let it coole; then breake it, and with an hammer beate off all the Cynder and Scurfe, till nothing be left but malleable mettall.

Then refine it according to the common manner before declared, and caſt up with your Penne the augmentation that is more than the Lead yeelded of it ſelfe: and if there be no augmentation, then that Minerall ſtone contained neither gold nor ſilver: for this is the moſt exquiſite way in the world to reduce gold or ſilver, which is hard to be reduced to a mettallicall body, through being ſtrongly mixed with either corroſive ſubſtances, or any other filth which hindreth his reduction: therefore if this way faile, you may ſet your heart at reſt for the ſeeking out of any other devices whatſoever, though the gliſtering ſparkes contained in the ſaid Minerall doe never ſo ſtrongly invite you; and you may conclude with the old ſaying, that all is not gold that gliſters.

But if it proſper, and yeelds any augmentation that is conſiderable: then if you deſire to know whether there was any Gold mixed with the Silver, as oftentimes there is, where ſilver is ſound without lead, then put the little bead, or pearle of ſilver, which remained on the Teſt into *Aqua-fortis*, and if all diſſolve, then there is no glold in that Mineral; but if a black powder remaine, then that is gold, and the quantity may be found by further triall.

CHAP. 8.

Wherein is ſhewed the Operations of gold: and reall experiments whereby any man may preſently trye whether any peece of gold bee true or counterfeit, without defacing or altering the forme thereof.

AS for the melting of it: if it be found

mixed

mixed with ſilver Oare, as oftentimes it commeth to paſſe, then it is to be melted, refined, and parted from the ſilver with *Aqua-fortis*, as is before declared, and if there bee not five times as much ſilver, as there is gold in the compoſition, then you muſt put to ſo much, or elſe the *Aqua-fortis* will not diſſolve it.

But if it be found in graines or powder, as often times it is, then you muſt put to it Borax in ſtead of Sandiver and Salt Peter, and ſo melt it downe as you did the other Oares before mentioned.

Now for ſo much as this mettal is the moſt rich of all the reſt, and moſt thirſted after, I wil enlarge my Diſcourſe for the gaining of means to find it out: alſo I wil ſhew the reaſon why this royal Mettal is many times found pure of it ſelfe, with little or no mixture of other baſe mettal with it.

And firſt, whereas it is oftentimes found in the ſand in Rivers, let no man thinke that it could be generated there, but that the ſwift motion of the water from the high Mountaines, brought it thither, with earth and altogether, till ſuch time as the motion of the Water grew more ſlow: and ſo according to its property, being not able to carry forward ſtil both the ſubſtances, did ſtill carry the earth with it, and let the heavier body ſinke.

Therefore I would have thoſe that have occaſion to deale in the hot Countries where gold is uſually generated, to make triall in all ſuch Rivers which runne from great Mountains with a ſwift courſe in ſuch places, where the motion of the water beginneth to grow ſlow.

And for this purpoſe he may have a little Bucket of Iron that will not lie in the bottom, but on one ſide, which ſide muſt have a ſhooe like a ſhovell; ſo that being drawne a little forward, as it lyeth in the bottome it will fill it ſelfe with ſand: which you may try by grinding it with Quick-ſilver whether it containe any gold: for if there be any gold in the ſand, it will mixe with the quick-ſilver willingly: then you may waſh away all the ſand, and ſtreine the quick-ſilver through a skinne of leather, and if any gold be gathered into it, there wil remaine a Ball in the Leather: then you may evapourate the Quick-ſilver from the Ball in a melting pot, and ſo melt downe the gold with a little *Borax*.

Alſo ſometimes gold is found in Rivers in powder and graines, farre diſtant from any mountaines of ſwift motion of water: this plainly demonſtrateth that the earth therabout containeth gold: a thing uſually in hot Countries, and that the water in that place had a convenient motion to weare away the earth, and to leave the gold behind; and this is manifeſtly ſeene by experience where they waſh whole mountains of earth with water, thereby to ſeparate the gold from it.

Now whereas I have formerly affirmed that al mettals in general are generated of the clammy and gluttenous part of the ſubterraneall vapours, ariſing from from *Bituminous* and *Sulphurous* ſubſtances, kindled in the bowells of the earth: it behooveth me to ſhew how gold, ſuch a fixed ſubſtance can be found pure of it ſelfe; and not mixed with other baſe mettals.

And the reaſon of this can be no other, but becauſe that all other mettalls whatſoever will putrifie in the earth in length of time, & turne to earth againe; but *gold* wil never putrifie by reaſon of his *excellent compoſition*, being made of a *Balſamick Sulphure*, or fatnes, which is incombuſtible, and differeth from the *Sulphure* or *fatnes* contained in the other *mettalls*, even as naturall *Balſome* differeth from all other *oyles*, & fat ſubſtances: ſo that though it be an *oyle* in ſhew, yet it wil ſink in water, whereas all other *oyles* wil ſwimme upon the top of the water.

And this is the cauſe why gold ſinketh ſo eagerly in *water*, which may be proved by *weighing* a 20. *ſhillings peece* of *gold* againſt his Braſſe *weight*, and then letting his *ſcales* ſink in a Bāſon of water 3. or 4. inches deep, the *gold* wil there over-weigh the *braſſe* about 9. or 10. grains, by reaſon that the *braſſe* is more enclined to *ſwimming* through the cumbuſtible *fatnes* or *ſulphure* in its compoſition; and as for the 20. *ſhillings peece*, ſo for any other peece of *gold* whatſoever according to its ſeveral *braſſe* weight you may in like manner try *whether it be true or counterfeit*.

probatum e

Now whereas the ſubſtance of *gold* is not ſubiect to putrifie in the earth by any length of time, it is probable enough that other mettalls might be *generated* with it at the firſt, and afterward *putrified* & *conſumed* from it in length of time, leaving the gold pure.

For I have drawne Iron, or a ſubſtance much like to filings, or *attoms* of Iron out of graine *gold* that was brought from *Gynnie* with a Load-ſtone, which ſeemed to bee Iron not fully putrified, and turned into earth.

And the reaſon why the hotter the Country is, the richer the Minerals are, can be no other but the ſame, that roaſted meates are ſweeter than boyled meates, or raw meates: the reaſon whereof is plaine, for that the rawiſh and unſavory part is exhaled by the heate of the fire, leaving the ſweeter part behind.

Even ſo in hot Countries, all that part of the ſubterraneall vapours, which here is condenſed into Lead, and other baſe mettalls, can there have no leave to congeale, by reaſon of the heate: but is all or moſt part thereof exhaled out of the Mines, leaving behind the royall mettals, whoſe property is to coagulate with heat: whereas the property of the baſe mettalls is to evapourate with heate and to congeale with cold.

The contrary opinion to this; namely that the ſubſtance of the beſt metals are convertible into royal mettals by heate and digeſtion, hath filled the world with falſe Books and receipts in *Alchimy*, and hath cauſed many men to ſpend much money, labour, ſtudy, and charges to no purpoſe.

For I know by good and long experience,

and by many accurate trialls that Quick-ſilver the moſt friendly *mineral* to the *royall mettalls*, can by no meanes or Artifice whatſoever be fixed and coagulated into either of the Royal Mettalls: alſo I have found ſince that no Author of any credit or Reputation teacheth any ſuch thing, but contrarily, condemneth all ſuch operations to be falſe, vaine and frivilous.

For the matter or ſubſtance of the Royal mettals is quite contrary to that of the baſe mettals, even as the fixed ſalt of any vegetable is different from the *volatill* or fugitive *ſalt* of the ſame. Yet I deny not but that by *Art* there may be drawne ſome ſmal fixed part out of the baſe *mettalls*, and may be converted into *Royall Mettall*, though with much labour, charges, and loſſe.

For as a Tree or other vegetable being burned, doth yeeld a fixed *ſalt* or Aſhes: ſo the baſe *mettalls* doe containe in them ſome ſmall quantity of matter of the ſame nature that the royall mettals are compounded of.

And for the further ſatisfaction to the Reader, I will ſhew in the next Chapter a true receite to make reall and true gold abiding all tryalls, and having all properties active and paſsive which true naturall gold hath:but in ſtead of gaine, loſſe will be ready to follow the worke.

CHAP. 9.

Wherein is ſhewed, how true and perfect gold may bee made by Art with loſſe to the workman.

Thus I wrought.

I Tooke eight ounces of *Regulus* of Iron and Copper, made as beneath is declared,and 16.ounces of common *Sublimate*, bought at the Apothicaries, & made theſe ingredients into fine powder: firſt, ſeverally, and then I ground them well together upon a Marble ſtone, and ſo put them into a retort of glaſſe,and drew from them firſt an Oile,then a ſubſtance like a Butter, and laſtly a yellow Sublimate,tincted with the tincture of Iron and Copper,which yellow Sublimate I rectified three or foure times,till it was very pure:then I mixed it with equal parts of an *Amalgam* of ſilver,and quick-ſilver, made as beneath is taught,and put it into another retort of Glaſſe, and forced away all but the ſilver, which remained like yellow horn: this yellow ſilver I *amalgamed* againe with new quick-ſilver, and ſet it in gentle heat about a week, then in very ſtrong heat for 6. houres; ſo that the *quick-ſilver* roſe up, and fell downe again upon the ſilver; till ſuch time as that it had carryed up all the ſilver from the bottome of the glaſſe into branches like trees: then I melted downe the ſilver, and fined it, and parted it with *Aqua-fortis*, and had divers graines of pure & good gold abiding all tryalls: but the quantity would not pay for halfe the charges and labour.

I made the *Regulus* thus: I took 4. ounces of Iron in ſtub nailes, and made them red hot in a cruſible: and then I put to it 8. ounces of *crude antimony*, and melted it downe, and when it was well and thin melted, I let it coole in the pot, & ſo knockt off the *regulus* from the ſop, or cynder which lay upon the top of it, then I did the like with 4. ounces of Copper in thin plats: & then I mixed equall parts of theſe two, and melted them 3. or 4. times, every time caſting into the pot halfe an ounce of ſalt peter, as it was in melting to purifie it, till it was pure & bright almoſt like ſilver, but yet brittle: ſo that I could beat it in a Morter to fine powder.

The yellow ſilver that was like yellow horn, did *Amalgam* with much difficulty,& grinding with ſalt and vinegar,and ſome of it was loſt, doe what I could:but the firſt ſilver was water ſilver, which I bought at the refiners , out of which they had taken all the gold before:this did *Amalgam* very eaſily,then I ſtrained it to a Ball through a Leather skinne, and ſo mixed it with the yellow ſublimate that was tincted yellow with the tincture of Iron and Copper.

The proportion of the quick-ſilver to the ſilver was 5. or 6. parts to one.

If any one doubt the truth of *Alchimy*,he may be ſatisfied by this triall;but in ſtead of gaine he ſhall pay for his learning , by going away with loſſe.

I doe not deny but there are workes of leſſe loſſe and charge,yet none of them lucrous by reaſon of the change of times.

For if any one will uphold me as good a leaſe, or purchaſe of land,as I can prove by credible records,hath bin had in former times for an ounce of gold , I will undertake to make an ounce of gold by Art to pay for it,and yet have a good bargaine.

But the difference of times hath confounded this Art, as may appeare more plainly beneath.

Firſt, in ancient times a mans worke was not worth above a penny a day, which now is worth two ſhillings ſixe pence a day, as may appeare by ancient records for buildings, and the like: ſo that there is thirty to one loſſe in the workmanſhip.

Secondly, then coales, veſſels, & other things neceſſary for theſe affaires did coſt little, in reſpect of the charge now.

Thirdly, when the gold was made, it would then have bought thirty or forty times as much, either lands, leaſes, victuals, or workmanſhip as now.

So that I conclude, that then the owners of this Art might gaine 30. or 40. for one, and yet now they ſhall loſe extreamly.

The cauſe that moved me to ſearch ſo much into theſe affaires, was, becauſe I ſaw by the bookes, that ſo divers men in divers ages, and in divers Countries did agree in one tale; wherby I conceived it unpoſsible to be a lye, now I conceive it might be true, but that the times have made an alteration.

Chap. 10.

Wherein is ſhewed the operations for ſome of the inferiour Mineralls.

AS for theſe baſe Minerals, *viz. Cinabar* naturall, *Antimony*, *Sulphur*, *Auripigment*, *Arſenick*, *Talcum*, *Muſcovy glaſſe*, *Emery*, and many other things of like nature, becauſe they are of ſmall value, and not worth the ſeeking for on ſet purpoſe, I will omit further to diſcourſe of them: if any man ſhall find them, or any of them, by accident, let him uſe his owne pleaſure, skill, and induſtry in the proceeding of them.

Nevertheleſſe, becauſe *Cinabar naturall* may containe much quick-ſilver, which is very uſefull for many things, & may prove as beneficial as a good mine of *mettal*, eſpecially if it ſhall be found in great plenty: I wil therfore ſhew the *refining ſeparating*, & *purifying* of the ſame in ſmal proportion: ſo that if it ſhal be found a *profitable* work, then the finder thereof may proceed to a greater work. The firſt thing then to be done, is to conſider of the weight therof: if it be very ponderous,reddiſh in colour,and ful of cleare ſtreakes,ſhining almoſt like the ſtreaks of *Antimony*,then it is a good ſigne of a rich Mine.

The firſt trial to be made thereof is to weigh a peece thereof,and ſo put it into a gentle fire for an houre or two, in ſuch ſort that it may onely be red hot; then to let it coole, and to weigh it againe,& ſo by the lightneſſe thereof, being compared with the former weight, you may iudge ſomewhat of the richneſſe thereof.

Then take a pound thereof,& beat it into fine powder,& mingle it well with as much unſleckt Lime,put it into a retort of glaſſe, luted with Potters clay, and ſome horſe dung well beaten and tempered together ; then ſet it in a little furnace in your Chimny corner,& force it with fire 12.houres: let it be kept red hot the laſt 4. houres, and let the noſe of the glaſſe enter into another glaſſe, filled almoſt full of water, in ſuch manner that the vapours of the *Cinabar* muſt needs enter into the water, for the better condenſation thereof into quick-ſilver.

This done, ſeparate your quick-ſilver in the bottom of the water,and drie it,and weigh it; if you find the quantity conſiderable,then you may proceed in this manner.

Firſt,

Firſt, make an hole in the earth with very good tempered clay that wil hold water, and let it be narrow in the bottome, and wider and wider above to the toppe to the breadth of 2. or 3. or 4. yards; then fill the Pit with water, & lay over it barres of iron of ſufficient ſtrength and thickneſſe to beare the burden that muſt lye upon it; and let them lye ſo neare together that the ſtones & wood cannot fal through: then lay thereupon a leere of drye wood, and a leere of your red ſtone not broken ſmall, and ſo doe againe till it be a yard thick or more, then give fire to it on the wind ſide, and goe away out of the danger of the fumes, till you ſee a far off that the fire is finiſhed and burned quite out.

Then repaire to your worke, and let out the water through a pipe of Lead, which ſhould be formerly laid almoſt at the bottome of the Pit, into another pit neare to it, made ſo deepe that it may receive the water, and in the bottome you ſhall finde great ſtore of Quick-ſilver, if the Mine was good.

The water may be pumped up againe to ſerve the next day for the ſame uſe; and you need but to take up a few of the bars of Iron every day to goe downe into the pit, to take out your Quick-ſilver,and ſo lay them downe againe.

CHAP. II.

Wherein is ſhewed the waies to find out Pit-coales: alſo the naturall cauſe of the generation of them, by a plaine demonſtration.

Though this Minerall be of ſmall value, yet if a good Mine thereof ſhall be diſcovered in ſome particular places of this land, the benefit thereof will farre exceed the profit of any mettall Mine uſually found in theſe Northerne Countries, by reaſon that wood is ſo greatly decayed of late yeares, that were it not for this helpe many people would be in danger to be ſtarved.

The firſt thing therefore which I would have to be diligently obſerved is; that this Mineral is uſually found in ground that is proane to beare wood and thornes, and not in the very fertile grounds,nor yet in the extreame barren grounds,but of an indifferent fertility, and in grounds that are uſually ſlower in their growth in the Spring time, than the fertile

Champion countries by a week or a fortninght.

Alſo the ſaid grounds are proane to bring forth large Cattell, and well horned: but not to feed the ſaid Cattell without a long time, nor yet will they ever be very fat upon the ſame ground. Alſo the ſprings iſſuing out of the ſaid grounds, are apt to colour the earth ruddy at their Orifice, like unto the ruſt of Iron.

Alſo the ſaid ſpring water being boiled as before is taught, doth uſually yeeld a black reſidence.

Alſo if you burie a new bowle of pure white Wood in the ſaid grounds, from *March* till *Midſummer*, with the mouth downeward, it wil be coloured blackiſh, with the ſubterraneal vapours.

Alſo I had a receipt given me for this purpoſe by one, that for his great experience, and excellent skill in naturall cauſes, ſeemed to be one of *Natures Darlings* : which becauſe I have not tryed, for want of opportunity, I will commend it as a very probable ſigne, and give ſuch Cautions, that any man may be ſure of it, before he trye his fortunes by digging or boaring, or any chargeable way.

And this was his direction : *about the middle of* May*, when the ſubterraneall vapours are ſtrong, which may be diſcerned by the Firne, which about that time will ſuddenly grow out of the earth in a night or two, almoſt an handful in length, then take a pure white peece of Tiffany, and wet it in the dew of the graſſe, which is all of that ſprings growth, and not ſoyled with cattell, nor no other thing, then wring out the dew from it; and do ſo five or ſixe times, and if there be coales the Tiffany will be a little blacked, and made foule with the ſooty vapours ariſing through the Coales, and condenſed amongſt the dew.*

Now to be ſure not to be deceived, do thus : firſt trye it where there are coales, and if ye find the ſignes above ſaid, yet truſt not to the experiment, till you have tried where there is no Coales in ſome other place, wherein it behoveth you to trye in divers places, till you find a place where the Tiffiany is not ſoyled at all; then you may be ſure that the experiment is true and unfailable.

I admoniſh him that ſhal trie with the *Tiffany* upon the dew, to let his hands be *waſhed* before with ſope & hot water; & wiped with a pure white cloth, til they wil not foule the cloth at al; elſe if they ſpend their *mony* in *digging*, & find nothing, they may thank their foule fingers for that misfortune.

As for the naturall cauſe of the generation of Coales, this demonſtration following doth make it manifeſt.

Take a peece of the blacke fat earth, which is uſually digged up in the weſt Countrey, where there are ſuch a multitude of Firre trees covered therewith, and which the people uſe to cut in the forme of Bricks, and to dr ye them, & ſo to burne them in ſtead of coales ; uſe this ſubſtance as you did the other earth in the beginning of the booke, to find out the natural cauſe of rocks, ſtones, and mettalls, and let it receive the vapours of the cumbuſtible ſubſtances, and you ſhall find this fat earth hardned into a plaine coale; even as you found the other leane earth hardned into a ſtone.

Whereby it appeareth that nature doth the ſame thing in the generation of coales under the ground, by the indurating of a fat earth with the ſubterraneal vapours which are apt to work a various effect, according to the ſubſtance which they meet withall.

Now wheras ſome of inquiſitive diſpoſitions wil deſire to know the naturall cauſe of that fat earth,generated in ſuch *ſubterraneall* Cavernes, let them be pleaſed to conſider that ſuch places in former times have bin the ſuperficies of the earth,and afterward have bin covered by the ſea with other earth,which may be demonſtrated by two wayes:firſt,it is evident that the mines of Coales doe lye in ſome places higher,and in other places lower,lively reſembling the *ſuperficies* of the earth,which is never directly equal, but every where various.

Secondly,every one may ſee in the *weſt Country*, where ſuch a multitude of Firre trees doe lie covered ſo deepe in the earth, that the ſuperficies of the earth was deeper then it is now in former ages,when thoſe trees were brought thither by the ſea : for it is evident that they never grew there:firſt, for that there groweth no Firre trees in that Countrey : ſecondly, for that they doe lie croſſe, and in ſuch uncooth manner,that no humane ſtrength could ever imitate nor paralell by any device whatſoever.

Alſo they may ſee the power of the ſea to alter the ſuperficies of the earth,by the multitude of earth there laid ſo many yards deepe upon the top of the trees.

Alſo they may ſee that the ſea doth make the difference of the nature of earthes by its varirious motion,as well as the unevenneſſe therof by hills and vallies : for there they may ſee that ſome earth will burne,and ſome will not burne,being both ſorts brought thither by the Sea, as appeareth evidently by the former diſcourſes.

Alſo the ſea never reſting, but pepetually winning land in one place,and loſing in another,doth ſhew what may be done in length of time,by a continuall operation, not ſubiect unto ceaſing,or intermiſsion.

CHAP. 12.

Wherein is ſhewed a perfect way to trye what colour any Berry,Leafe,Flower,Stalke,Root,Fruit,Seed, Barke,or Wood will give : alſo a perfect way to make colours fixed,which will not abide the ordinary way.

HEre I muſt confeſſe a manifeſt digreſſion from my Subiect : yet in regard of the great benefit which this experiment may bring to the Countrey, out of the new Plantations,and other places, where it is very probable that many of theſe things be hidden and unknowne,I wil crave pardon,for that my intent was chiefely to prevent the loſſe of thoſe things which may doe much good,were it not through ignorance or negligence.

Firſt then take halfe a pint of water,and halfe a pint of float, made as beneath, 2. *penny weight* of *Allom*, 12. graines of *Tartar* finely beaten, & put all into a *Tinne* veſſel, which is better than *earth*,*lead*,or *copper*; ſet it on a Trivet to diſſolve the *Allom* upon a gentle fire : as ſoone as it beginneth to boile,take a peece of white wollen cloth,well ſcoured with Sope,fullers earth,or Lee,or altogether, to take out the greaſe of it, being wel waſhed out with faire water,& then dryed in the aire or Sun,not by the fire : the cloth muſt weigh but halfe an ounce;then tie a thrid to the end of the cloth,& when the *liquor* beginneth to boile,then put in the cloth,& let it boile an houre;then take out the cloth,let it coole,waſh it in two or three waters;then take any berry,leafe,flower,ſtalke,root,fruit, ſeed, barke,or wood,and bruiſe them wel;put them in faire water , and boyle them with a gentle fire to extract the tincture ; then put in the cloth formerly prepared,which wil ſhew what Colour they will give.

To make the Float.

Boyle an Hogs-head of water, then caſt in a Buſhell of wheate Branne, then draw the fire, then let it ſtand three or foure dayes, till it grow ſowriſh.

But for ſmall tryalls a little will ſerve, obſerving proportion betweene the Water and the Branne.

A *proportion* muſt be obſerved in the allowing of all ſtuffes before they receive their colours: Firſt, the *proportion* of Allom to the water; which is one of Allom to 16. of water, and floate: Secondly, the *proportion* of the *Tartar* to the *Allom*; which is one of *Tartar* to 4. of *Allom*: Thirdly, the *proportion* of *Allom* to the Cloath, which is one of *Allom* to five of the Cloath.

Note that all ſilkes muſt be Allomed cold, or elſe they will loſe their luſter.

The way to finde what tincture is hidden in any vegetable or in any part thereof.

Take the vegetable, being cut green, & ſtamp and grind the ſame, as if it were to make iuice thereof, then preſſe out the ſuperfluous moiſture; the remainder make up in Balls, and lay them up together, that they may gather a little heat, but let them not heat too much, for then they will turne to dung:theſe being ſufficiently fermented muſt be dryed,and afterwards uſed as Oade is uſed.

Another way as Indico is made.

Make a pit with Timber and boards, about a foote deep, and as wide, and as long as you pleaſe, being well clayed in the bottome and ſides; then fill this pit with any vegetable cut greene; then put as much water to it as wil cover the herbes: let it ſtand expoſed to the Sunne two or three daies: then with a plugge at the bottome draw out all the water, and caſt it away: then fill the pit againe with freſh water, and when it hath ſtood the like time, draw it away as the former: this do ſo often, till you find that the herbe will be eaſily brought into a muſsilage; then it muſt be trod, and beaten with wodden inſtruments, like rammers, til it wil come al to a muſsilage: then it muſt be taken and wrung through haire Sives, like *Caſsia Fiſtula* extracted, to keepe the ſtalkes, and great Fibres for paſsing through: afterwards the Muſsilage or pappe that paſſeth through, muſt be dryed in the Sunne, and ſo formed into Cakes like to Indico.

Another way.

Take the vegetable cut greene, and ſtampe and grind it: then take an Hogs-head and fill it with halfe water, and halfe bruiſed herbes, ſet it out of the Sunne, with the bung hole open two or three inches, till it firment and worke like Wine or Beere: after it hath done working the Herbes will ſinke, which at the firſt did ſwimme, and the liquor will grow a little ſowriſh; then let it be ſet abroad in the Sunne, and brought into vinegar, as wine and Beere is brought into vinegar, and then that colour can never bee ſtained with other Vinegar or Vrine, becauſe it is ſufficiently impregnated, and his appetite ſatisfied with his owne proper Vinegar: when his ſubſtance is thus turned into Vinegar, the cleare Vinegar muſt be drawne from it, the remainder muſt be uſed as the former Indico, and ſome water to that, to bee ſure to fetch out all his tartarous muſsilage, muſt be put to the Vinegar, and dryed away in the Sunne, and ſo they come like Indico: *In tincturamtartarizatam fixam de occulto in manifeſtum.*

And whereas Barkes, Woods, and Rootes are of a drye compoſition, and will not ferment of themſelves with water like greene Herbes, or vegetables : therefore they muſt be well ground,or thinne ſhaven , and there muſt bee added in ſtead of Water, Iuice of Grapes, Peares, Apples, or Wort made of Malt, or other graine, into which the Wood,Barke, or Rootes muſt be put : let them ferment together, and afterwards be turned into Vinegar; then the cleare Vinegar muſt be extracted : the reſidue of the tincture muſt bee extracted with freſh water, and both of them muſt be breathed away in the Sunne,as before, and ſo brought in his perfect tincture.

By this which hath beene declared in this Chapter, it may appeare to every one having an inquiſitive diſpoſition, what is the true naturall cauſe why ſome colours are fixed, and wil not ſtaine with vinegar,urine, nor yet fade with the Aire;which hath in it a certaine acetoſity,or ſharpe aiery ſalt of the nature of vinegar,which thoſe tinctures draw to them,which have not their appetites fully ſatisfied before with ſuch ſpirituall or aiery ſalts ; and this is further manifeſt for that all ſuch tinctures which are moſt firme & fixed,& are not ſubiect to ſtaining or fading , being taſted upon the tongue, may be felt ſomewhat ſharpiſh or ſowriſh.

And the cauſe of this appetitive and attractive vertue in colours is no other but the very ſame which is betwixt the Load-ſtone and Iron : for take the Load-ſtone, and burne it till all his blew vapour be exhaled, and then he will draw no more Iron : thereby ſhewing plainely, that it was that aiery ſalt, tincted with the venereall, or vegetable greenneſſe, which the Iron thirſted after, to ſatisfie his thirſty and drye nature and conſtitution, which he got by his calcination and fuſion.

And the like attraction may be diſcerned by the intellectuall eyes , in any thing that is ſtrongly burnt, ſo that all his ſpirits are exhaled : as Lime will draw the aiery ſubſtance to him , and thereby quench himſelfe : Alſo Tartar burned, and laid in the Aire, will draw the ſharper part of the aire to it , and thereby diſſolve it ſelfe : and in ſumme, all corporeal ſubſtances, the more they have loſt their ſpirituall parts by naturall, or artificiall operation , the ſtronger is their Attractive vertue.

Now in ſtead of filling the Readers head with Proclamations, I will conclude my Booke with giving eaſe to his memory, by preſcribing what neceſſaries he is to provide for the accompliſhing of his ſeverall deſignes, in his Voyages or Plantations, whither his occaſions ſhall draw him.

And firſt for him that will onely trie his fortunes in the ſearching for Mineralls.

He will neede nothing but two or three Pipkins, two or three Vrinalls, an Iron Picke-Axe well ſteeled, a Spade, and a Crow of Iron, if he will be at the charge thereof: but there is no great neceſsity: alſo if he bee not acquainted with the ſeverall Oares of mettalls, it will be convenient that he take with him a little peece of every ſort of Oares: or ſo many ſeverall kindes as he can get.

And for him that would proceede further, to trye the value of them himſelfe, he muſt provide theſe things following.

A Grate of Iron of a foote broad, ſome Bricks, two paire of good hand-bellowes, a paire of Tonges, ſome Lead, Salt-Peter, Sandiver, Borax, Flanders melting Pots, a ring of Iron for the Teſt, an hatchet, or handſaw to cut wood: ſome good Aqua-fortis, Weights and Scales: and if any man be not active handed, he may have a man for a trifle to ſhew him the Manuell practice in a day before he goe his voyage.

And for him that will ſearch for Dying ſtuffes, hee may ſee in the laſt Chapter what things he ſhall ſtand in neede of: Alſo the other Chapters may be peruſed, whereby every one may be the better accommodated for their ſeverall enterpriſes.

FINIS.